Date: Thu, 16 Jun 94 04:30:17 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V94 #189
To: Ham-Ant

Ham-Ant Digest Thu, 16 Jun 94 Volume 94 : Issue 189

Today's Topics:

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Wed, 15 Jun 1994 19:29:22 GMT
From: ncar!csn!col.hp.com!srgenprp!alanb@ames.arpa
Subject: 2 rx antennas on a repeater? how to?
To: ham-ant@ucsd.edu

F. Kevin Feeney (fkf1@cornell.edu) wrote:

: My question is can I do some sort of relatively
: simple merging of our normal omni rx antenna and
: a beam aimed to favor the desired area? I'm aware
: of the impeadance issues of blending the two,
: I'm thinking we'd build some sort of buffer/combiner
: but I'm more interested how the two antennas will
: interact with phasing of incoming signals and such.
: They'll be far enough apart on the tower to not interact
: field wise, but I don't want to end up with all kinds of
: nulls in the pattern because of multipath type selective

: fading.

You're exactly right: If the two antennas happen to be 180 degrees
out of phase and equal amplitude in a certain direction, there will
be a deep null.

Let's say your omni antenna has 6 dB gain and the beam has 15 dB gain.
Assuming the beam has a well-controlled pattern, the two antennas
should have the same gain in only two directions: the -9 dB points
on either side of the beam's main lobe. By varying the horizontal
spacing between the two antennas, it should be possible to avoid
having 180 degree phase difference between them in those two
directions, thus avoiding the nulls. This will work best if the
vertical separation of the antennas is not too great.

I would think a few hours experimenting (preferably on the ground in
a convenient location) would find a configuration that would work.

AL N1AL

Date: Wed, 15 Jun 1994 17:17:51 GMT
From: ihnp4.ucsd.edu!swrinde!emory!rsiatl!ke4zv!gary@network.ucsd.edu
Subject: AM/FM Antenna Splitting
To: ham-ant@ucsd.edu

In article <Pine.3.05.9406151031.C1863-a100000@stargate> rdixon@stargate.acs.ohio-
state.edu (Bob Dixon) writes:
>I use an automotive AM/FM radio in my shack for general listening, because
>it runs off 12vdc which I use for all the radios. The problem with auto
>radios is they use the same antenna for both AM and FM. An auto whip doesn't
>work at all well in the shack (basement, no ground plane, etc). I tried one
>of those amplified AM/FM antennas from Brookstone (also available elsewhere)
>and it was worthless. So I want to use REAL AM and FM antennas, outdoors etc.
>But the problem is how does one connect them both to the same antenna
>jack? Are there tuned splitters available for this purpose? I have looked at
>the schematic of the radio, and it appears the two front ends are just
>connected together, so I suppose I could tear into the radio and separate
>them, but would rather not. Has anyone solved this problem, or have suggestions?

Just tie the separate AM and FM antennas together via a diplexer if
you're a purist. Impedance mismatches really don't matter much for
receiving, though, so you can skip the diplexer if you like. I suspect
all you *really* need is to get the auto whip outside, and it'll work
like it does on a car for both bands. Remember it's a voltage probe
at AM and needs a low capacitance cable back to the radio, not regular
coax. Best would be an untuned FET amp at the antenna driving coax in

an emitter follower configuration. Phantom power could be arranged up
the cable.

Gary
--
Gary Coffman KE4ZV | You make it, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | we break it. | uunet!rsiatl!ke4zv!gary
534 Shannon Way | Guaranteed! | emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 | |

Date: 15 Jun 1994 20:37:23 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!europa.eng.gtefsd.com!uhog.mit.edu!
news.kei.com!ssd.intel.com!chnews!scorpion.ch.intel.com!jbromley@network.ucsd.edu
Subject: Antenna radiation pattern charts
To: ham-ant@ucsd.edu

I blathered:

>>. . .Since when is directionality even a defined antenna parameter?? . . .

In article <2tijhf$40o@tekadm1.cse.tek.com>,
Roy W Lewallen <roy.lewallen@tek.com> replied:

>It isn't, but *directivity* is. It's the ratio of maximum power density
>to average power density. For a lossless antenna, this equals the gain
>in dBi in the direction of maximum radiation strength. (For a lossy antenna,
>the directivity equals the maximum gain in dBi plus the loss in dB.)

After an exhaustive literature search, I have found that directionality
is the property that antennas exhibit of having their main pattern
lobes where the DX isn't.

Jim, W5GYJ

Date: 15 Jun 1994 11:39:07 -0700
From: ihnp4.ucsd.edu!usc!howland.reston.ans.net!europa.eng.gtefsd.com!
uhog.mit.edu!news.kei.com!ssd.intel.com!chnews!ornews.intel.com!ornews.intel.com!
not-for-mail@network.ucsd.edu
Subject: Antennas in free space?
To: ham-ant@ucsd.edu

In article <DEAN.94Jun15073032@splinter.coe.neu.edu>
dean@splinter.coe.northeastern.edu writes:

>   If the impedence of free space is 377 ohms (approx.), why aren't
>antennas matched to it? Why 50 ohms? Is it more convenient for some reason?

I have posted this same question in the past and have never received a satisfactory answer. Usually the explanation is along the lines of the antenna performing an impedance matching function, sorta like a horn matches the high pressure, low volume of a speaker to the high volume, low pressure requirements of free air. I don't really think so.

Actually, the free space impedance is 377 ohms PER METER which implies some sort of linear measurement. It is derived from the formula:

 377 ohms/meter = square root(mu/epsilon)

I'll leave it to the net geniuses to further explain that.
  I presume the meter is measured parallel to the electrostatic wave plane. I've seen speculation that folded dipoles and twinlead provide the nearest match to free space. A half wave folded dipole for the 2 meter band is about 1 meter long and around 300 ohms. Fed with 300 ohm twinlead, this presents the nearest match to free space with easily available equipment. But it doesn't seem to have any magical quality other than working as good or better than other antennas. By tweaking the conductor size and spacing of the folded dipole it could be brought closer to 377 ohms. Then make your own ladder line with wires spaced about 3/4" apart to get 377 ohms. Maybe something magic happens then.
--
zardoz@ornews.intel.com WA7LDV

Date: Wed, 15 Jun 1994 17:06:37 GMT
From: ihnp4.ucsd.edu!swrinde!emory!rsiatl!ke4zv!gary@network.ucsd.edu
Subject: Antennas in free space?
To: ham-ant@ucsd.edu

In article <DEAN.94Jun15073032@splinter.coe.neu.edu>
dean@splinter.coe.northeastern.edu writes:
>Hi:
>   If the impedence of free space is 377 ohms (approx.), why aren't
>antennas matched to it? Why 50 ohms? Is it more convenient for some reason?

Antennas *are* the matching device between your feedline and the impedance of free space. This is most obvious with a horn antenna.

Gary
--
Gary Coffman KE4ZV | You make it, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | we break it. | uunet!rsiatl!ke4zv!gary

534 Shannon Way | Guaranteed! | emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 |

Date: Thu, 16 Jun 1994 03:15:02 GMT
From: ihnp4.ucsd.edu!news.cerf.net!pelican!ent-img.com!wb6hqk!
bart@network.ucsd.edu
Subject: Antennas in free space?
To: ham-ant@ucsd.edu

In article <2tnhss$7s8@ornews.intel.com>,
Jim Garver <zardoz@ornews.intel.com> wrote:
>In article <DEAN.94Jun15073032@splinter.coe.neu.edu>
dean@splinter.coe.northeastern.edu writes:
>
>Actually, the free space impedance is 377 ohms PER METER which implies some
>sort of linear measurement. It is derived from the formula:

Actually the impedance of free space is 120 * PI = 377 (approx) OHMS.

> 377 ohms/meter = square root(mu/epsilon)
For free space:
  mu = 4 * PI * 10^-7 Henry / meter (by definition) and a
         Henry = 1.0 volt-sec / amp   so...
  mu = 4 * PI * 10^-7 volt-sec/(amp-meter)

  epsilon = 8.85 * 10^-12 Farad / meter (measured or derived value) and a
         Farad = 1.0 coulomb / volt = 1.0 amp-sec / volt   giving
  epsilon = 8.85 * 10^-12 amp-sec / (volt-meter)

  Z = sqrt(mu / epsilon) = sqrt(4 * PI * 10^-7 volt-sec/(amp-meter) /
                                  8.85 * 10^-12 amp-sec/(volt-meter)) =
     = 376.82 volts / amp = 376.8 ohms

Volume resistivity has the dimensions of ohms / meter but that is a different
property and is infinite for a perfect insulator such as free space.

bart

bart@wb6hqk.ent-img.com

>
>I'll leave it to the net geniuses to further explain that.
> I presume the meter is measured parallel to the electrostatic wave plane.
>I've seen speculation that folded dipoles and twinlead provide the nearest

>match to free space. A half wave folded dipole for the 2 meter band is
>about 1 meter long and around 300 ohms. Fed with 300 ohm twinlead, this
>presents the nearest match to free space with easily available equipment.
>But it doesn't seem to have any magical quality other than working as good
>or better than other antennas. By tweaking the conductor size and spacing
>of the folded dipole it could be brought closer to 377 ohms. Then make
>your own ladder line with wires spaced about 3/4" apart to get 377 ohms.
>Maybe something magic happens then.
>--
>zardoz@ornews.intel.com WA7LDV

Date: Thu, 16 Jun 1994 06:06:41 GMT
From: ihnp4.ucsd.edu!swrinde!emory!rsiatl!ke4zv!gary@network.ucsd.edu
Subject: Antennas in free space?
To: ham-ant@ucsd.edu

In article <2tnhss$7s8@ornews.intel.com> zardoz@ornews.intel.com (Jim Garver)
writes:
>In article <DEAN.94Jun15073032@splinter.coe.neu.edu>
dean@splinter.coe.northeastern.edu writes:
>
>>   If the impedence of free space is 377 ohms (approx.), why aren't
>>antennas matched to it? Why 50 ohms? Is it more convenient for some reason?
>
>I have posted this same question in the past and have never received a
>satisfactory answer. Usually the explanation is along the lines of the
>antenna performing an impedance matching function, sorta like a horn matches
>the high pressure, low volume of a speaker to the high volume, low pressure
>requirements of free air. I don't really think so.

For horn antennas the analogy is exact. The TM and TE vectors are matched
to the free space impedance by the horn's taper (the waves are constrained
by the conductive walls to a preset expansion ratio). This is most easily seen
in terms of retarded potentials. (I won't attempt the notation here, look
in Reference Data for Radio Engineers pg 1029.) For halfwave dipole antennas,
the matching isn't so obvious, but it's there too expressed in terms of an
integration of the fields of an infinite number of infinitesimal elementary
dipoles (ibid pg 663).

>Actually, the free space impedance is 377 ohms PER METER which implies some
>sort of linear measurement. It is derived from the formula:
>
> 377 ohms/meter = square root(mu/epsilon)
>
>I'll leave it to the net geniuses to further explain that.

The reason this is so is that c=1/sqrt(eo*uo) IE the velocity of light
in free space is a function of the permitivity and permeability of free
space. Since the velocity of light is a distance per unit time, and frequency
is 1/t we get a wavelength expressed in terms of distance that's related
to the impedance of free space via a roundabout application of the Poynting
vector and Ohm's law. (I won't even attempt to derive that here.)

> I presume the meter is measured parallel to the electrostatic wave plane.
>I've seen speculation that folded dipoles and twinlead provide the nearest
>match to free space. A half wave folded dipole for the 2 meter band is
>about 1 meter long and around 300 ohms. Fed with 300 ohm twinlead, this
>presents the nearest match to free space with easily available equipment.
>But it doesn't seem to have any magical quality other than working as good
>or better than other antennas. By tweaking the conductor size and spacing
>of the folded dipole it could be brought closer to 377 ohms. Then make
>your own ladder line with wires spaced about 3/4" apart to get 377 ohms.
>Maybe something magic happens then.

No, nothing magic happens. You're just confusing the feed point impedance
of the antenna with it's matching action to free space. Assume the folded
dipole is cut for 20 meters, now your numbers don't show the coincidence
they do at 2 meters, but the antenna works just the same. You can visualize
a folded dipole as an ordinary dipole with a T match that reaches from
end to end. There's nothing magic here. Unlike the transmission line,
the currents in both wires of the folded dipole are in phase so the
potentials across the wires at any point along the dipole are equal,
and so are the currents, just as if it were a single fat conductor.
This is so because the ends are shorted, forcing the phases to be the
same. Now what is the impedance of a line with equal potentials?
Zo=(E1-E2)/(I1-I2) Since E1=E2 and I1=I2 at any point along the line,
the impedance of the folded dipole section when viewed as a transmission
line is zero because dividing any number into zero still gives zero.
That's the same as saying it's one big fat perfect conductor.

The reason a folded dipole looks like 300 Ohms (roughly) at it's
feed point is that P=I^2*R. Since P is constant in either an ordinary
dipole or a folded dipole, but the current at the feedpoint of the
folded dipole is halved because the other wire carries an equal current
(phased together by having their ends shorted remember), R=P/(.5)^2
and P's a constant, so R=4*k, or four times the value it would be
for an ordinary single wire center fed dipole, or 75*4=300 Ohms.
No magic.

Gary
--
Gary Coffman KE4ZV | You make it, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | we break it. | uunet!rsiatl!ke4zv!gary
534 Shannon Way | Guaranteed! | emory!kd4nc!ke4zv!gary

Lawrenceville, GA 30244 | |

Date: Thu, 16 Jun 94 03:51:17 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!csulb.edu!csus.edu!netcom.com!netcomsv!
skyld!jangus@network.ucsd.edu
Subject: Magnet Mount Problem
To: ham-ant@ucsd.edu

In article <2tng9c$8sg@news.bu.edu> david@med-buspheb.bu.edu writes:

> Today I reached to pull my mag-mount antenna off of my trunk and found
> myself with the antenna and base in my hand and the magnet still stuck
> to the trunk.

What to use to glue the magnet back onto the mount successfully...

3M Weather Strip Adhesive. Otherwise known by a variety of rude names such as gorilla snot etc. Clean both mating surfaces first. Scrape the remains of the old stuff off if you can. Smear the glue on both surfaces. Stick them together. Pull them apart, and watch the "strings" form between the two surfaces. Blow lightly and watch them go from shiny to frosted. Stick them back together. This will outlast you rig, marriage and car.

73 es GE fom Jeff

 Amateur: WA6FWI@WA6FWI.#SOCA.CA.USA.NOAM | "You have a flair for adding
Internet: jangus@skyld.grendel.com | a fanciful dimension to any
 US Mail: PO Box 4425 Carson, CA 90749 | story."
   Phone: 1 (310) 324-6080 | Peking Noodle Co.

Hate "Green Card Lottery"? Want to help curb ignorant crossposting on Usenet?
E-mail ckeroack@hamp.hampshire.edu for more information, or read news.groups.

Date: 16 Jun 94 06:54:44 GMT
From: dog.ee.lbl.gov!agate!howland.reston.ans.net!torn!spartan.ac.BrockU.CA!
s9898198@ucbvax.berkeley.edu
Subject: Railroad track as an antenna?
To: ham-ant@ucsd.edu

I have heard a legend that a college radio station (either at MIT, Tufts, or Swarthmore) welded antenna to railroad tracks, and peeved the FCC by broadcasting nationwide. Is this true? If anyone knows, please email me

(or post here) If you do know, could you please direct me to some documentation regarding this legend if you can.

This is very important! Thanks in advance.

James R. Storm
Accounting Student
s9898198@sandcastle.cosc.brocku.ca
(905) 227-9571 voice

This message was brought to you by the letters M, Q, and the number 6

End of Ham-Ant Digest V94 #189
****